

WHAT IS CLAIMED IS:

1. A liftable suspension system for use on a vehicle, comprising:
5 first and second wheel spindles positioned to extend outwardly at each respective lateral side of the vehicle, the first and second spindles being displaceable independent of each other; and
an actuator operable to raise at least the first spindle, so that a tire rotatably connected to the first spindle is liftable out of engagement with a road
10 surface when the actuator raises the first spindle.
2. The suspension system according to claim 1, wherein each of the first and second spindles is rotatable.
- 15 3. The suspension system according to claim 1, wherein each of the first and second spindles is rotatably connected to a respective one of first and second support devices.
4. The suspension system according to claim 3, wherein the first and
20 second devices are independently displaceable relative to each other.

5. The suspension system according to claim 3, wherein each of the first and second devices is pivotably connected to a frame of the vehicle when the suspension system is attached to the vehicle.

5 6. The suspension system according to claim 3, wherein each of the first and second spindles is connected via a steering knuckle to the respective one of the first and second devices.

7. The suspension system according to claim 3, wherein each of the
10 first and second spindles is pivotably attached to a king pin of the respective one of the first and second devices.

8. The suspension system according to claim 3, wherein the actuator is connected to the first device, so that the actuator applies an upwardly biasing
15 force to the first device when the actuator raises the first spindle.

9. The suspension system according to claim 8, wherein the actuator is connected between the first device and a bracket configured for attachment to a frame of the vehicle.

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10. The suspension system according to claim 9, wherein an arm is pivotably connected to the first device, and is pivotably connected to the bracket.

11. The suspension system according to claim 3, wherein each of the first and second devices is pivotably connected to a respective one of first and second arms, each of the first and second arms being configured for pivotable
5 connection to a frame of the vehicle.

12. The suspension system according to claim 11, wherein the actuator is attached between the first arm and the first device.

10 13. The suspension system according to claim 11, wherein the actuator elongates between an attachment to the first arm and an attachment to the first device to thereby raise the first spindle.

14. The suspension system according to claim 13, wherein the
15 attachment to the first arm includes a bracket which secures an end of the actuator to the first arm.

15. The suspension system according to claim 13, wherein the attachment to the first device includes an inwardly extending portion of the first
20 device, the portion extending inwardly relative to a pivot between the first arm and the first device.

16. The suspension system according to claim 15, wherein an air spring is attached to an upper side of the first device portion, and wherein the actuator is attached to a lower side of the first device portion.

5 17. The suspension system according to claim 11, wherein each of the first and second arms is a lower arm of a parallel link-type suspension.

18. The suspension system according to claim 11, wherein each of the first and second arms is an upper arm of a parallel link-type suspension.

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19. The suspension system according to claim 11, wherein the actuator is connected between the first arm and a bracket, the first arm being pivotably connected to the bracket.

15 20. The suspension system according to claim 11, wherein the actuator applies a force to the first arm to thereby pivot the first arm relative to the first device when the first spindle is raised.

21. The suspension system according to claim 20, wherein the actuator
20 also applies an oppositely directed force to the first device to thereby pivot the first arm relative to the first device when the first spindle is raised.

22. The suspension system according to claim 20, wherein the actuator also applies an oppositely directed force to a bracket to thereby pivot the first arm relative to the first device when the first spindle is raised, the first arm being pivotably connected to the bracket.

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23. The suspension system according to claim 22, wherein the bracket is configured for attachment to the vehicle frame.

24. The suspension system according to claim 11, further comprising a
10 third arm pivotably connected to the first device, and wherein the actuator applies a force to the first arm and an oppositely directed force to the third arm when the first spindle is raised.

25. The suspension system according to claim 11, wherein at least one
15 of the first and second arms is made of a composite material.

26. The suspension system according to claim 25, wherein the composite material is a resin-impregnated fabric.

27. A liftable suspension system for use on a vehicle, comprising:

first and second wheel spindles;

first and second support devices, each of the first and second spindles
extending outwardly relative to a respective one of the first and second support
5 devices;

first and second arms, each of the first and second support devices being
pivotably connected to a respective one of the first and second arms, and each of
the first and second arms being configured for pivotable connection to a frame of
the vehicle; and

10 an actuator operative to lift at least the first support device relative to the
vehicle frame when the suspension system is attached to the frame,

and wherein the first and second support devices are displaceable relative
to the vehicle frame independently of each other when the suspension system is
attached to the frame.

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28. The suspension system according to claim 27, wherein each of the
first and second spindles is rotatable relative to the respective one of the first and
second devices.

20 29. The suspension system according to claim 27, wherein each of the
first and second devices has a respective one of first and second king pins secured

thereto, and wherein each of the first and second spindles is pivotably connected to a respective one of the first and second king pins.

30. The suspension system according to claim 27, wherein the
5 suspension system is steerable by rotating the first and second spindles.

31. The suspension system according to claim 30, wherein a tie rod connected between the first and second spindles forces the first and second spindles to rotate together.

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32. The suspension system according to claim 27, wherein the actuator applies a force to the first device and an oppositely directed force to the first arm when the first device is lifted relative to the vehicle frame.

15 33. The suspension system according to claim 27, wherein the actuator applies a force to the first arm and an oppositely directed force to a bracket when the first device is lifted relative to the vehicle frame.

34. The suspension system according to claim 33, wherein the first arm
20 is pivotably connected to the bracket.

35. The suspension system according to claim 33, wherein the actuator is pivotably connected to the first arm.

36. The suspension system according to claim 33, wherein the bracket
5 is attached to the vehicle frame when the suspension system is attached to the vehicle.

37. The suspension system according to claim 27, wherein the actuator is connected to a first side of a portion of the first device, the actuator applying a
10 first force to the first device portion when the first device is lifted relative to the frame, and wherein an air spring is connected to an opposite second side of the first device portion, the air spring applying a second force to the first device portion to bias the first device downwardly relative to the frame.

15 38. The suspension system according to claim 27, wherein a third arm is pivotably connected to the first device, and wherein the actuator applies a force to the first arm and an oppositely directed force to the third arm when the first device is lifted relative to the vehicle frame.

20 39. The suspension system according to claim 27, wherein each of the first and second arms is part of a parallel link-type suspension.

40. The suspension system according to claim 27, further comprising an air spring connected to the first device and configured for attachment to the vehicle frame for downwardly biasing the first device relative to the frame, the air spring having an upper end which is upwardly positioned relative to a lower side
5 of the frame when the suspension system is attached to the frame.

41. The suspension system according to claim 27, further comprising an air spring connected to the first device and configured for attachment to the vehicle frame for downwardly biasing the first device relative to the frame, the
10 entire air spring being outwardly positioned relative to the frame when the suspension system is attached to the frame.

42. The suspension system according to claim 27, wherein at least one of the first and second arms is made of a composite material.

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43. The suspension system according to claim 42, wherein the composite material is a resin-impregnated fabric.

44. The suspension system according to claim 27, wherein the actuator
20 is connected to the first device, so that the actuator applies an upwardly biasing force to the first device to thereby lift the first device.

45. The suspension system according to claim 44, wherein the actuator is connected between the first device and a bracket configured for attachment to the vehicle frame.

5 46. The suspension system according to claim 45, wherein the first arm is pivotably connected to the bracket.